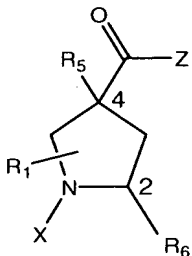


Amendments to the Claims:

The listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (currently amended): A compound having the formula



(I)

where:

X represents a first amine protecting group that is different from Y, wherein the first amine protecting group is selected from the group consisting of 9-fluorenylmethyl carbamate, allyl carbamate, benzyl carbamate, substituted benzyl carbamate, t-butyl carbamate, 1-adamantyl carbamate, 2-nitrobenzenesulfonyl, triphenylmethyl, (4-methoxyphenyl)diphenylmethyl, and 9-phenylfluorenyl;

Y represents a second amine protecting group that is different from X, wherein the second amine protecting group is selected from the group consisting of 9-fluorenylmethyl carbamate, allyl carbamate, benzyl carbamate, substituted benzyl carbamate, t-butyl carbamate, 1-adamantyl carbamate, 2-nitrobenzenesulfonyl, triphenylmethyl, (4-methoxyphenyl)diphenylmethyl, and 9-phenylfluorenyl;

Z represents a weak leaving group selected from the group consisting of short chain alkoxides, thiolates, azide, and sulfonamides;

R₁ represents an H and can be attached to the molecule at positions 2, 3 or 5;

R₅ represents N₃ or -NH-Y;

R₆ represents a carboxylic acid; and

the stereochemical configuration at positions 2 and 4 is selected from the group consisting of (R,R), (R,S), (S,R), and (S,S).

Claims 2-3 (canceled).

Claim 4 (original): The compound of Claim 1, wherein Z is OMe.

Claim 5 (previously presented): The compound of Claim 1, wherein X is selected from the group consisting of benzyl-carbamate and t-butyl carbamate.

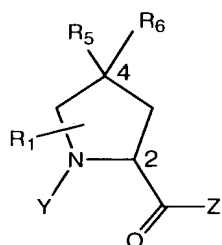
Claim 6 (original): The compound of Claim 1, wherein Y is 2-nitrobenzenesulfonamide.

Claim 7 (original): The compound of Claim 1, wherein Y is 9-fluoroenylmethylcarbamate.

Claim 8 (previously presented): The compound of Claim 1, wherein X is benzylcarbamate, R₅ is -NH-Y, Y is 9-fluoroenylmethylcarbamate, Z is -OMe, and R₆ is a carboxylic acid.

Claims 9-12 (canceled).

13. (withdrawn) A compound having the formula



(2)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R₁ represents an H, or a functional group, and can be attached to the molecule at positions 2, 3 or 5;

R₂ represents an H or a functional group;

R₅ represents N₃ or NR₂X;

R₆ represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at positions 2 and 4 and of the carbon bearing R₁ (if R₁ is not H) can be any one of (S,S,S), (S,S,R), (S,R,S), (S,R,R), (R,S,S), (R,S,R), (R,R,S) or (R,R,R).

14. (withdrawn) (withdrawn) The compound of Claim 13, wherein R₅ is N₃.

15. (withdrawn) The compound of Claim 13, wherein R₅ is NR₂X.

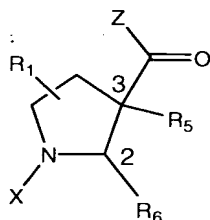
16. (withdrawn) The compound of Claim 13, wherein Z is OMe.

17. (withdrawn) The compound of Claim 13, wherein X is benzylcarbamate.

18. (withdrawn) The compound of Claim 13, wherein Y is 2-nitrobenzenesulfonamide.

19. (withdrawn) The compound of Claim 13, wherein Y is 9-fluoroenylmethylcarbamate.

20. (withdrawn) The compound of Claim 13, wherein X is benzylcarbamate, R_5 is NR_2X , R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is $-OMe$, and R_6 is a carboxylic acid.
21. (withdrawn) The compound of Claim 13, wherein R_1 is an alkene.
22. (withdrawn) The compound of Claim 13, wherein R_1 is a protected carboxylate.
23. (withdrawn) The compound of Claim 13, wherein R_1 is a protected alcohol.
24. (withdrawn) The compound of Claim 13, wherein R_1 is a protected thiol.
25. (withdrawn) A compound having the formula



(3)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 4 or 5;

R_2 represents an H or a functional group;

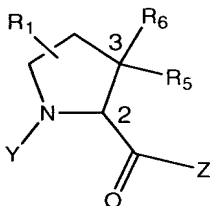
R_5 represents N_3 or NR_2Y ;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at positions 2 and 3 and of the carbon bearing R_1 (if R_1 is not H) can be any one of (S,S,S), (S,S,R), (S,R,S), (S,R,R), (R,S,S), (R,S,R), (R,R,S) or (R,R,R).

26. (withdrawn) The compound of Claim 25, wherein R_5 is N_3 .
27. (withdrawn) The compound of Claim 25, wherein R_5 is NR_2Y .
28. (withdrawn) The compound of Claim 25, wherein Z is OMe .
29. (withdrawn) The compound of Claim 25, wherein X is benzylcarbamate.
30. (withdrawn) The compound of Claim 25, wherein Y is 2-nitrobenzenesulfonamide.
31. (withdrawn) The compound of Claim 25, wherein Y is 9-fluoroenylmethylcarbamate.

32. (withdrawn) The compound of Claim 25, wherein X is benzylcarbamate, R_5 is NR_2Y , R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is $-OMe$, and R_6 is a carboxylic acid.
33. (withdrawn) The compound of Claim 25, wherein R_1 is an alkene.
34. (withdrawn) The compound of Claim 25, wherein R_1 is a protected carboxylate.
35. (withdrawn) The compound of Claim 25, wherein R_1 is a protected alcohol.
36. (withdrawn) The compound of Claim 25, wherein R_1 is a protected thiol.
37. (withdrawn) A compound having the formula

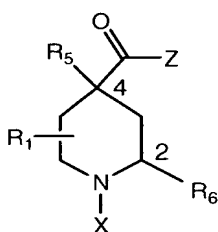


(4)

where:

- X represents a first amine protecting group;
 - Y represents a second amine protecting group;
 - Z represents a weak leaving group;
 - R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 4 or 5;
 - R_2 represents an H or a functional group;
 - R_5 represents N_3 or NR_2X ;
 - R_6 represents a carboxylic acid or a strongly activated ester ; and
 - the stereochemical configuration at positions 2 and 3 and of the carbon bearing R_1 (if R_1 is not H) can be any one of (S,S,S), (S,S,R), (S,R,S), (S,R,R), (R,S,S), (R,S,R), (R,R,S) or (R,R,R).
38. (withdrawn) The compound of Claim 37, wherein R_5 is N_3 .
39. (withdrawn) The compound of Claim 37, wherein R_5 is NR_2X .
40. (withdrawn) The compound of Claim 37, wherein Z is OMe .
41. (withdrawn) The compound of Claim 37, wherein X is benzylcarbamate.
42. (withdrawn) The compound of Claim 37, wherein Y is 2-nitrobenzenesulfonamide.
43. (withdrawn) The compound of Claim 37, wherein Y is 9-fluoroenylmethylcarbamate.

44. (withdrawn) The compound of Claim 37, wherein X is benzylcarbamate, R_5 is NR_2X , R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is $-OMe$, and R_6 is a carboxylic acid.
45. (withdrawn) The compound of Claim 37, wherein R_1 is an alkene.
46. (withdrawn) The compound of Claim 37, wherein R_1 is a protected carboxylate.
47. (withdrawn) The compound of Claim 37, wherein R_1 is a protected alcohol.
48. (withdrawn) The compound of Claim 37, wherein R_1 is a protected thiol.
49. (withdrawn) A compound having the formula



(5)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 5 or 6;

R_2 represents an H or a functional group;

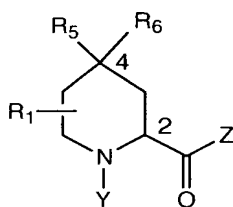
R_5 represents N_3 or NR_2Y ;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at positions 2 and 4 and of the carbon bearing R_1 (if R_1 is not H) can be any one of (S,S,S), (S,S,R), (S,R,S), (S,R,R), (R,S,S), (R,S,R), (R,R,S) or (R,R,R).

50. (withdrawn) The compound of Claim 49, wherein R_5 is N_3 .
51. (withdrawn) The compound of Claim 49, wherein R_5 is NR_2Y .
52. (withdrawn) The compound of Claim 49, wherein Z is OMe .
53. (withdrawn) The compound of Claim 49, wherein X is benzylcarbamate.
54. (withdrawn) The compound of Claim 49, wherein Y is 2-nitrobenzenesulfonamide.
55. (withdrawn) The compound of Claim 49, wherein Y is 9-fluoroenylmethylcarbamate.

56. (withdrawn) The compound of Claim 49, wherein X is benzylcarbamate, R_5 is NR_2Y , R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is $-OMe$, and R_6 is a carboxylic acid.
57. (withdrawn) The compound of Claim 49, wherein R_1 is an alkene.
58. (withdrawn) The compound of Claim 49, wherein R_1 is a protected carboxylate.
59. (withdrawn) The compound of Claim 49, wherein R_1 is a protected alcohol.
60. (withdrawn) The compound of Claim 49, wherein R_1 is a protected thiol.
61. (withdrawn) A compound having the formula



(6)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 5 or 6;

R_2 represents an H or a functional group;

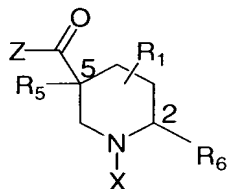
R_5 represents N_3 or NR_2X ;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at positions 2 and 4 and of the carbon bearing R_1 (if R_1 is not H) can be any one of (S,S,S), (S,S,R), (S,R,S), (S,R,R), (R,S,S), (R,S,R), (R,R,S) or (R,R,R).

62. (withdrawn) The compound of Claim 61, wherein R_5 is N_3 .
63. (withdrawn) The compound of Claim 61, wherein R_5 is NR_2X .
64. (withdrawn) The compound of Claim 61, wherein Z is OMe .
65. (withdrawn) The compound of Claim 61, wherein X is benzylcarbamate.
66. (withdrawn) The compound of Claim 61, wherein Y is 2-nitrobenzenesulfonamide.
67. (withdrawn) The compound of Claim 61, wherein Y is 9-fluoroenylmethylcarbamate.

68. (withdrawn) The compound of Claim 61, wherein X is benzylcarbamate, R_5 is NR_2X , R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is $-OMe$, and R_6 is a carboxylic acid.
69. (withdrawn) The compound of Claim 61, wherein R_1 is an alkene.
70. (withdrawn) The compound of Claim 61, wherein R_1 is a protected carboxylate.
71. (withdrawn) The compound of Claim 61, wherein R_1 is a protected alcohol.
72. (withdrawn) The compound of Claim 61, wherein R_1 is a protected thiol.
73. (withdrawn) A compound having the formula



(7)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 4 or 6;

R_2 represents an H or a functional group;

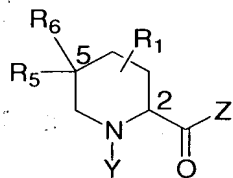
R_5 represents N_3 or NR_2Y ;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at positions 2 and 5 and of the carbon bearing R_1 (if R_1 is not H) can be any one of (S,S,S), (S,S,R), (S,R,S), (S,R,R), (R,S,S), (R,S,R), (R,R,S) or (R,R,R).

74. (withdrawn) The compound of Claim 73, wherein R_5 is N_3 .
75. (withdrawn) The compound of Claim 73, wherein R_5 is NR_2Y .
76. (withdrawn) The compound of Claim 73, wherein Z is OMe .
77. (withdrawn) The compound of Claim 73, wherein X is benzylcarbamate.
78. (withdrawn) The compound of Claim 73, wherein Y is 2-nitrobenzenesulfonamide.
79. (withdrawn) The compound of Claim 73, wherein Y is 9-fluoroenylmethylcarbamate.

80. (withdrawn) The compound of Claim 73, wherein X is benzylcarbamate, R_5 is NR_2Y , R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is $-OMe$, and R_6 is a carboxylic acid.
81. (withdrawn) The compound of Claim 73, wherein R_1 is an alkene.
82. (withdrawn) The compound of Claim 73, wherein R_1 is a protected carboxylate.
83. (withdrawn) The compound of Claim 73, wherein R_1 is a protected alcohol.
84. (withdrawn) The compound of Claim 73, wherein R_1 is a protected thiol.
85. (withdrawn) A compound having the formula

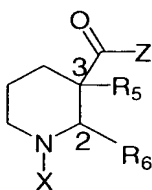


(8)

where:

- X represents a first amine protecting group;
- Y represents a second amine protecting group;
- Z represents a weak leaving group;
- R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 5 or 6;
- R_2 represents an H or a functional group;
- R_5 represents N_3 or NR_2X ;
- R_6 represents a carboxylic acid or a strongly activated ester ; and
- the stereochemical configuration at positions 2 and 5 and of the carbon bearing R_1 (if R_1 is not H) can be any one of (S,S,S), (S,S,R), (S,R,S), (S,R,R), (R,S,S), (R,S,R), (R,R,S) or (R,R,R).
86. (withdrawn) The compound of Claim 85, wherein R_5 is N_3 .
87. (withdrawn) The compound of Claim 85, wherein R_5 is NR_2X .
88. (withdrawn) The compound of Claim 85, wherein Z is OMe .
89. (withdrawn) The compound of Claim 85, wherein X is benzylcarbamate.
90. (withdrawn) The compound of Claim 85, wherein Y is 2-nitrobenzenesulfonamide.
91. (withdrawn) The compound of Claim 85, wherein Y is 9-fluoroenylmethylcarbamate.

92. (withdrawn) The compound of Claim 85, wherein X is benzylcarbamate, R_5 is NR_2X , R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is $-OMe$, and R_6 is a carboxylic acid.
93. (withdrawn) The compound of Claim 85, wherein R_1 is an alkene.
94. (withdrawn) The compound of Claim 85, wherein R_1 is a protected carboxylate.
95. (withdrawn) The compound of Claim 85, wherein R_1 is a protected alcohol.
96. (withdrawn) The compound of Claim 85, wherein R_1 is a protected thiol.
97. (withdrawn) A compound having the formula



(9)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 4, 5 or 6;

R_2 represents an H or a functional group;

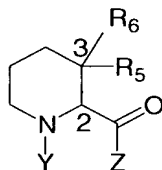
R_5 represents N_3 or NR_2Y ;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at positions 2 and 3 and of the carbon bearing R_1 (if R_1 is not H) can be any one of (S,S,S), (S,S,R), (S,R,S), (S,R,R), (R,S,S), (R,S,R), (R,R,S) or (R,R,R).

98. (withdrawn) The compound of Claim 97, wherein R_5 is N_3 .
99. (withdrawn) The compound of Claim 97, wherein R_5 is NR_2Y .
100. (withdrawn) The compound of Claim 97, wherein Z is OMe .
101. (withdrawn) The compound of Claim 97, wherein X is benzylcarbamate.
102. (withdrawn) The compound of Claim 97, wherein Y is 2-nitrobenzenesulfonamide.
103. (withdrawn) The compound of Claim 97, wherein Y is 9-fluoroenylmethylcarbamate.
104. (withdrawn) The compound of Claim 97, wherein X is benzylcarbamate, R_5 is NR_2Y , R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is $-OMe$, and R_6 is a carboxylic acid.

105. (withdrawn) The compound of Claim 97, wherein R_1 is an alkene.
 106. (withdrawn) The compound of Claim 97, wherein R_1 is a protected carboxylate.
 107. (withdrawn) The compound of Claim 97, wherein R_1 is a protected alcohol.
 108. (withdrawn) The compound of Claim 97, wherein R_1 is a protected thiol.
 109. (withdrawn) A compound having the formula



(10)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 4, 5 or 6;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2X ;

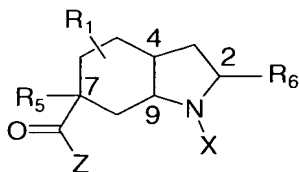
R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at positions 2 and 3 and of the carbon bearing R_1 (if R_1 is not H) can be any one of (S,S,S), (S,S,R), (S,R,S), (S,R,R), (R,S,S), (R,S,R), (R,R,S) or (R,R,R).

110. (withdrawn) The compound of Claim 109, wherein R_5 is N_3 .
 111. (withdrawn) The compound of Claim 109, wherein R_5 is NR_2X .
 112. (withdrawn) The compound of Claim 109, wherein Z is OMe.
 113. (withdrawn) The compound of Claim 109, wherein X is benzylcarbamate.
 114. (withdrawn) The compound of Claim 109, wherein Y is 2-nitrobenzenesulfonamide.
 115. (withdrawn) The compound of Claim 109, wherein Y is 9-fluoroenylmethylcarbamate.
 116. (withdrawn) The compound of Claim 109, wherein X is benzylcarbamate, R_5 is NR_2X , R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is -OMe, and R_6 is a carboxylic acid.
 117. (withdrawn) The compound of Claim 109, wherein R_1 is an alkene.
 118. (withdrawn) The compound of Claim 109, wherein R_1 is a protected carboxylate.
 119. (withdrawn) The compound of Claim 109, wherein R_1 is a protected alcohol.

120. (withdrawn) The compound of Claim 109, wherein R_1 is a protected thiol.

121. (withdrawn) A compound having the formula



(11)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 4, 5, 6, 8 or 9;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2Y ;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at positions 2, 4, 7, 9 and of the carbon bearing R_1 (if R_1 is not H) can be any of the 32 combinations of (R) and (S).

122. (withdrawn) The compound of Claim 121, wherein R_5 is N_3 .

123. (withdrawn) The compound of Claim 121, wherein R_5 is NR_2Y .

124. (withdrawn) The compound of Claim 121, wherein Z is OMe.

125. (withdrawn) The compound of Claim 121, wherein X is benzylcarbamate.

126. (withdrawn) The compound of Claim 121, wherein Y is 2-nitrobenzenesulfonamide.

127. (withdrawn) The compound of Claim 121, wherein Y is 9-fluoroenylmethylcarbamate.

128. (withdrawn) The compound of Claim 121, wherein X is benzylcarbamate, R_5 is NR_2Y , R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is -OMe, and R_6 is a carboxylic acid.

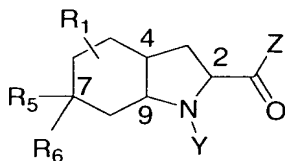
129. (withdrawn) The compound of Claim 121, wherein R_1 is an alkene.

130. (withdrawn) The compound of Claim 121, wherein R_1 is a protected carboxylate.

131. (withdrawn) The compound of Claim 121, wherein R_1 is a protected alcohol.

132. (withdrawn) The compound of Claim 121, wherein R_1 is a protected thiol.

133. (withdrawn) A compound having the formula



(12)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R₁ represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 4, 5, 6, 8 or 9;

R₂ represents an H or a functional group;

R₅ represents N₃ or NR₂X;

R₆ represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at positions 2, 4, 7, 9 and of the carbon bearing R₁ (if R₁ is not H) can be any of the 32 combinations of (R) and (S).

134. (withdrawn) The compound of Claim 133, wherein R₅ is N₃.

135. (withdrawn) The compound of Claim 133, wherein R₅ is NR₂X.

136. (withdrawn) The compound of Claim 133, wherein Z is OMe.

137. (withdrawn) The compound of Claim 133, wherein X is benzylcarbamate.

138. (withdrawn) The compound of Claim 133, wherein Y is 2-nitrobenzenesulfonamide.

139. (withdrawn) The compound of Claim 133, wherein Y is 9-fluoroenylmethylcarbamate.

140. (withdrawn) The compound of Claim 133, wherein X is benzylcarbamate, R₅ is NR₂X, R₂ is H, Y is 9-fluoroenylmethylcarbamate, Z is -OMe, and R₆ is a carboxylic acid.

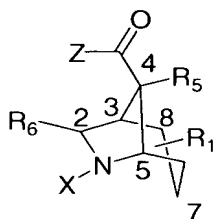
141. (withdrawn) The compound of Claim 133, wherein R₁ is an alkene.

142. (withdrawn) The compound of Claim 133, wherein R₁ is a protected carboxylate.

143. (withdrawn) The compound of Claim 133, wherein R₁ is a protected alcohol.

144. (withdrawn) The compound of Claim 133, wherein R₁ is a protected thiol.

145. (withdrawn) A compound having the formula



(13)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R₁ represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 5, 6, 7 or 8;

R₂ represents an H or a functional group;

R₅ represents N₃ or NR₂Y;

R₆ represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at the positions 2, 3, 4 and 5, and of the carbon bearing

R₁ (if R₁ is not H) can be any of the 32 combinations of (R) and (S).

146. (withdrawn) The compound of Claim 145, wherein R₅ is N₃.

147. (withdrawn) The compound of Claim 145, wherein R₅ is NR₂Y.

148. (withdrawn) The compound of Claim 145, wherein Z is OMe.

149. (withdrawn) The compound of Claim 145, wherein X is benzylcarbamate.

150. (withdrawn) The compound of Claim 145, wherein Y is 2-nitrobenzenesulfonamide.

151. (withdrawn) The compound of Claim 145, wherein Y is 9-fluoroenylmethylcarbamate.

152. (withdrawn) The compound of Claim 145, wherein X is benzylcarbamate, R₅ is NR₂Y, R₂ is H, Y is 9-fluoroenylmethylcarbamate, Z is -OMe, and R₆ is a carboxylic acid.

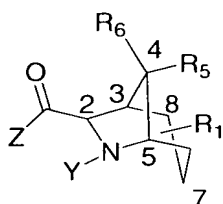
153. (withdrawn) The compound of Claim 145, wherein R₁ is an alkene.

154. (withdrawn) The compound of Claim 145, wherein R₁ is a protected carboxylate.

155. (withdrawn) The compound of Claim 145, wherein R₁ is a protected alcohol.

156. (withdrawn) The compound of Claim 145, wherein R₁ is a protected thiol.

157. (withdrawn) A compound having the formula



(14)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R₁ represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 5, 6, 7 or 8;

R₂ represents an H or a functional group;

R₅ represents N₃ or NR₂X;

R₆ represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at the positions 2, 3, 4 and 5, and of the carbon bearing R₁ (if R₁ is not H) can be any of the 32 combinations of (R) and (S).

158. (withdrawn) The compound of Claim 157, wherein R₅ is N₃.

159. (withdrawn) The compound of Claim 157, wherein R₅ is NR₂X.

160. (withdrawn) The compound of Claim 157, wherein Z is OMe.

161. (withdrawn) The compound of Claim 157, wherein X is benzylcarbamate.

162. (withdrawn) The compound of Claim 157, wherein Y is 2-nitrobenzenesulfonamide.

163. (withdrawn) The compound of Claim 157, wherein Y is 9-fluoroenylmethylcarbamate.

164. (withdrawn) The compound of Claim 157, wherein X is benzylcarbamate, R₅ is NR₂X, R₂ is H, Y is 9-fluoroenylmethylcarbamate, Z is -OMe, and R₆ is a carboxylic acid.

165. (withdrawn) The compound of Claim 157, wherein R₁ is an alkene.

166. (withdrawn) The compound of Claim 157, wherein R₁ is a protected carboxylate.

167. (withdrawn) The compound of Claim 157, wherein R₁ is a protected alcohol.

168. (withdrawn) The compound of Claim 157, wherein R₁ is a protected thiol.

169. (withdrawn) A method of synthesizing *bis* peptides comprising the steps of:

1) providing a solid support;

- 2) activating a first *bis* amino acid or naturally occurring amino acid;
- 3) attaching the *bis* amino acid or naturally occurring amino acid to the support;
- 4) removing the leading edge amine protecting group if a *bis* amino acid is used, or the amine protecting group if a naturally occurring amino acid is used;
- 5) activating and attaching a next *bis* amino acid or a next naturally occurring amino acid to the leading edge amine of the *bis* amino acid or amine of the naturally occurring amino acid; and
- 6) repeating steps 4 and 5 as necessary to achieve the desired chain length;
- 7) detaching the synthesized *bis* peptide from the support; and
- 8) isolating the synthesized *bis* peptide,

where the *bis* peptide synthesized in the above manner has at least two contiguous *bis* amino acids, and a rigidification step is carried out either after step 4 or after detachment of the *bis* peptide from the solid support.

170. (withdrawn) The method of Claim 169, further comprising the step of modifying or adding a functional group, after step 5.

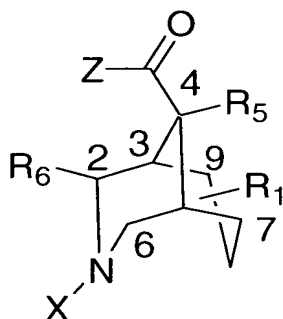
171. (withdrawn) A method of synthesizing *bis* peptides comprising the steps of:

- 1) providing a *bis*-amino acid or *bis*-peptide fragment containing a mixture of *bis*-amino acid and naturally occurring amino acid with an unprotected leading edge amine and a protected trailing edge carboxylic acid;
- 2) providing a *bis*-s or *bis*-peptide fragment containing a mixture of *bis*-amino acid and naturally occurring amino acids with a protected leading edge amine and an activated ester;
- 3) coupling the two fragments in solution;
- 4) isolating the synthesized *bis*-peptide;
- 5) removing the leading edge amine protecting group or the trailing end carboxylic acid protecting group; and
- 6) repeating steps 1,2,3,4 to achieve the desired chain length;

where the *bis* peptide synthesized in the above manner has at least two contiguous *bis* amino acids, and a rigidification step is carried out either after step 3 or after detachment of the *bis* peptide from the solid support.

172. (withdrawn) The method of Claim 171, further comprising the step of modifying or adding a functional group, after step 3.

173. (withdrawn) A compound having the formula



(15)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R₁ represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 5, 6, 7, 8 or 9;

R₂ represents an H or a functional group;

R₅ represents N₃ or NR₂Y;

R₆ represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at the positions 2, 3, 4 and 5, and of the carbon bearing R₁ (if R₁ is not H) can be any of the 32 combinations of (R) and (S).

174. (withdrawn) The compound of Claim 173, wherein R₅ is N₃.

175. (withdrawn) The compound of Claim 173, wherein R₅ is NR₂Y.

176. (withdrawn) The compound of Claim 173, wherein Z is OMe.

177. (withdrawn) The compound of Claim 173, wherein X is benzylcarbamate.

178. (withdrawn) The compound of Claim 173, wherein Y is 2-nitrobenzenesulfonamide.

179. (withdrawn) The compound of Claim 173, wherein Y is 9-fluoroenylmethylcarbamate.

180. (withdrawn) The compound of Claim 173, wherein X is benzylcarbamate, R₅ is NR₂Y, R₂ is H, Y is 9-fluoroenylmethylcarbamate, Z is -OMe, and R₆ is a carboxylic acid.

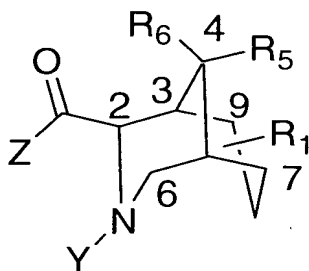
181. (withdrawn) The compound of Claim 173, wherein R₁ is an alkene.

182. (withdrawn) The compound of Claim 173, wherein R₁ is a protected carboxylate.

183. (withdrawn) The compound of Claim 173, wherein R₁ is a protected alcohol.

184. (withdrawn) The compound of Claim 173, wherein R₁ is a protected thiol.

185. (withdrawn) A compound having the formula



(16)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R₁ represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 5, 6, 7, 8 or 9;

R₂ represents an H or a functional group;

R₅ represents N₃ or NR₂X;

R₆ represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at the positions 2, 3, 4 and 5, and of the carbon bearing

R₁ (if R₁ is not H) can be any of the 32 combinations of (R) and (S).

186. (withdrawn) The compound of Claim 185, wherein R₅ is N₃.

187. (withdrawn) The compound of Claim 185, wherein R₅ is NR₂X.

188. (withdrawn) The compound of Claim 185, wherein Z is OMe.

189. (withdrawn) The compound of Claim 185, wherein X is benzylcarbamate.

190. (withdrawn) The compound of Claim 185, wherein Y is 2-nitrobenzenesulfonamide.

191. (withdrawn) The compound of Claim 185, wherein Y is 9-fluoroenylmethylcarbamate.

192. (withdrawn) The compound of Claim 185, wherein X is benzylcarbamate, R₅ is NR₂X, R₂ is H, Y is 9-fluoroenylmethylcarbamate, Z is -OMe, and R₆ is a carboxylic acid.

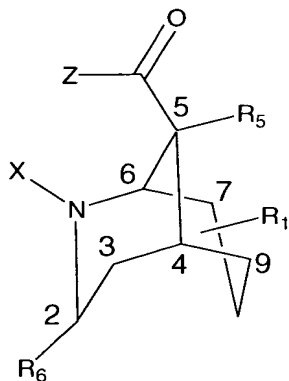
193. (withdrawn) The compound of Claim 185, wherein R₁ is an alkene.

194. (withdrawn) The compound of Claim 185, wherein R₁ is a protected carboxylate.

195. (withdrawn) The compound of Claim 185, wherein R₁ is a protected alcohol.

196. (withdrawn) The compound of Claim 185, wherein R₁ is a protected thiol.

197. (withdrawn) A compound having the formula



(17)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R₁ represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 4, 6, 7, 8 or 9;

R₂ represents an H or a functional group;

R₅ represents N₃ or NR₂Y;

R₆ represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at the positions 2, 4, 5 and 6, and of the carbon bearing

R₁ (if R₁ is not H) can be any of the 32 combinations of (R) and (S).

198. (withdrawn) The compound of Claim 197, wherein R₅ is N₃.

199. (withdrawn) The compound of Claim 197, wherein R₅ is NR₂Y.

200. (withdrawn) The compound of Claim 197, wherein Z is OMe.

201. (withdrawn) The compound of Claim 197, wherein X is benzylcarbamate.

202. (withdrawn) The compound of Claim 197, wherein Y is 2-nitrobenzenesulfonamide.

203. (withdrawn) The compound of Claim 197, wherein Y is 9-fluoroenylmethylcarbamate.

204. (withdrawn) The compound of Claim 197, wherein X is benzylcarbamate, R₅ is NR₂Y, R₂ is H, Y is 9-fluoroenylmethylcarbamate, Z is -OMe, and R₆ is a carboxylic acid.

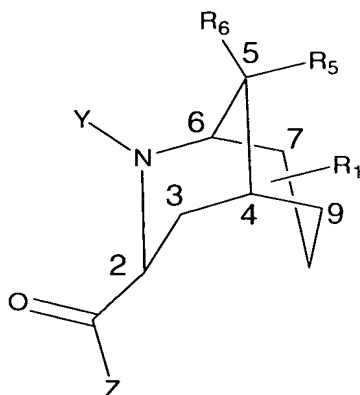
205. (withdrawn) The compound of Claim 197, wherein R₁ is an alkene.

206. (withdrawn) The compound of Claim 197, wherein R₁ is a protected carboxylate.

207. (withdrawn) The compound of Claim 197, wherein R₁ is a protected alcohol.

208. (withdrawn) The compound of Claim 197, wherein R_1 is a protected thiol.

209. (withdrawn) A compound having the formula



(18)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 4, 6, 7, 8 or 9;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2X ;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at the positions 2, 4, 5 and 6, and of the carbon bearing R_1 (if R_1 is not H) can be any of the 32 combinations of (R) and (S).

210. (withdrawn) The compound of Claim 209, wherein R_5 is N_3 .

211. (withdrawn) The compound of Claim 209, wherein R_5 is NR_2X .

212. (withdrawn) The compound of Claim 209, wherein Z is OMe.

213. (withdrawn) The compound of Claim 209, wherein X is benzylcarbamate.

214. (withdrawn) The compound of Claim 209, wherein Y is 2-nitrobenzenesulfonamide.

215. (withdrawn) The compound of Claim 209, wherein Y is 9-fluoroenylmethylcarbamate.

216. (withdrawn) The compound of Claim 209, wherein X is benzylcarbamate, R_5 is NR_2X , R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is $-OMe$, and R_6 is a carboxylic acid.

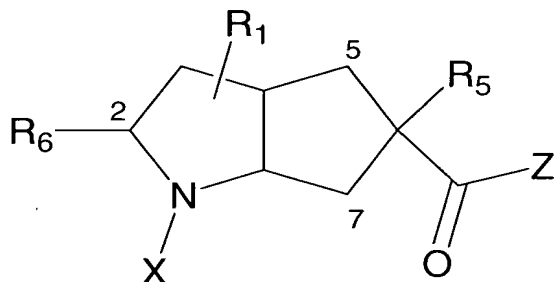
217. (withdrawn) The compound of Claim 209, wherein R_1 is an alkene.

218. (withdrawn) The compound of Claim 209, wherein R_1 is a protected carboxylate.

219. (withdrawn) The compound of Claim 209, wherein R_1 is a protected alcohol.

220. (withdrawn) The compound of Claim 209, wherein R_1 is a protected thiol.

221. (withdrawn) A compound having the formula



(19)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 4, 5, 7 or 8;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2Y ;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at the positions 2, 4, 6 and 8, and of the carbon bearing

R_1 (if R_1 is not H) can be any of the 32 combinations of (R) and (S).

222. (withdrawn) The compound of Claim 221, wherein R_5 is N_3 .

223. (withdrawn) The compound of Claim 221, wherein R_5 is NR_2Y .

224. (withdrawn) The compound of Claim 221, wherein Z is OMe.

225. (withdrawn) The compound of Claim 221, wherein X is benzylcarbamate.

226. (withdrawn) The compound of Claim 221, wherein Y is 2-nitrobenzenesulfonamide.

227. (withdrawn) The compound of Claim 221, wherein Y is 9-fluoroenylmethylcarbamate.

228. (withdrawn) The compound of Claim 221, wherein X is benzylcarbamate, R_5 is NR_2Y , R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is $-OMe$, and R_6 is a carboxylic acid.

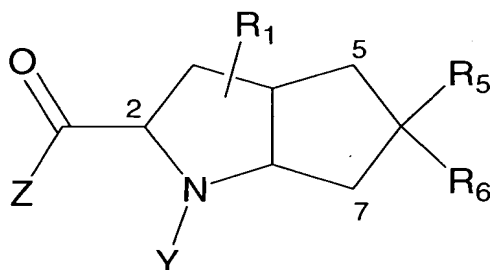
229. (withdrawn) The compound of Claim 221, wherein R_1 is an alkene.

230. (withdrawn) The compound of Claim 221, wherein R_1 is a protected carboxylate.

231. (withdrawn) The compound of Claim 221, wherein R_1 is a protected alcohol.

232. (withdrawn) The compound of Claim 221, wherein R_1 is a protected thiol.

233. (withdrawn) A compound having the formula



(20)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R_1 represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 4, 5, 7 or 8;

R_2 represents an H or a functional group;

R_5 represents N_3 or NR_2X ;

R_6 represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at the positions 2, 4, 6 and 8, and of the carbon bearing

R_1 (if R_1 is not H) can be any of the 32 combinations of (R) and (S).

234. (withdrawn) The compound of Claim 233, wherein R_5 is N_3 .

235. (withdrawn) The compound of Claim 233, wherein R_5 is NR_2X .

236. (withdrawn) The compound of Claim 233, wherein Z is OMe.

237. (withdrawn) The compound of Claim 233, wherein X is benzylcarbamate.

238. (withdrawn) The compound of Claim 233, wherein Y is 2-nitrobenzenesulfonamide.

239. (withdrawn) The compound of Claim 233, wherein Y is 9-fluoroenylmethylcarbamate.

240. (withdrawn) The compound of Claim 233, wherein X is benzylcarbamate, R_5 is NR_2X , R_2 is H, Y is 9-fluoroenylmethylcarbamate, Z is -OMe, and R_6 is a carboxylic acid.

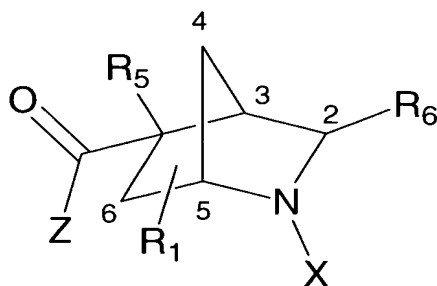
241. (withdrawn) The compound of Claim 233, wherein R_1 is an alkene.

242. (withdrawn) The compound of Claim 233, wherein R_1 is a protected carboxylate.

243. (withdrawn) The compound of Claim 233, wherein R_1 is a protected alcohol.

244. (withdrawn) The compound of Claim 233, wherein R_1 is a protected thiol.

245. (withdrawn) A compound having the formula



(21)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R₁ represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 4, 5 or 6;

R₂ represents an H or a functional group;

R₅ represents N₃ or NR₂Y;

R₆ represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at the positions 2, 3, 5 and 7, and of the carbon bearing R₁ (if R₁ is not H) can be any of the 32 combinations of (R) and (S).

246. (withdrawn) The compound of Claim 245, wherein R₅ is N₃.

247. (withdrawn) The compound of Claim 245, wherein R₅ is NR₂Y.

248. (withdrawn) The compound of Claim 245, wherein Z is OMe.

249. (withdrawn) The compound of Claim 245, wherein X is benzylcarbamate.

250. (withdrawn) The compound of Claim 245, wherein Y is 2-nitrobenzenesulfonamide.

251. (withdrawn) The compound of Claim 245, wherein Y is 9-fluoroenylmethylcarbamate.

252. (withdrawn) The compound of Claim 245, wherein X is benzylcarbamate, R₅ is NR₂Y, R₂ is H, Y is 9-fluoroenylmethylcarbamate, Z is -OMe, and R₆ is a carboxylic acid.

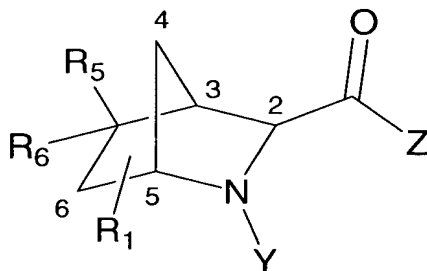
253. (withdrawn) The compound of Claim 245, wherein R₁ is an alkene.

254. (withdrawn) The compound of Claim 245, wherein R₁ is a protected carboxylate.

255. (withdrawn) The compound of Claim 245, wherein R₁ is a protected alcohol.

256. (withdrawn) The compound of Claim 245, wherein R₁ is a protected thiol.

257. (withdrawn) A compound having the formula



(22)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R₁ represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 4, 5 or 6;

R₂ represents an H or a functional group;

R₅ represents N₃ or NR₂X;

R₆ represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at the positions 2, 3, 5 and 7, and of the carbon bearing

R₁ (if R₁ is not H) can be any of the 32 combinations of (R) and (S).

258. (withdrawn) The compound of Claim 257, wherein R₅ is N₃.

259. (withdrawn) The compound of Claim 257, wherein R₅ is NR₂X.

260. (withdrawn) The compound of Claim 257, wherein Z is OMe.

261. (withdrawn) The compound of Claim 257, wherein X is benzylcarbamate.

262. (withdrawn) The compound of Claim 257, wherein Y is 2-nitrobenzenesulfonamide.

263. (withdrawn) The compound of Claim 257, wherein Y is 9-fluoroenylmethylcarbamate.

264. (withdrawn) The compound of Claim 257, wherein X is benzylcarbamate, R₅ is NR₂X, R₂ is H, Y is 9-fluoroenylmethylcarbamate, Z is -OMe, and R₆ is a carboxylic acid.

265. (withdrawn) The compound of Claim 257, wherein R₁ is an alkene.

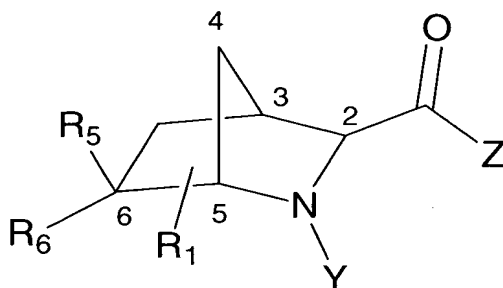
266. (withdrawn) The compound of Claim 257, wherein R₁ is a protected carboxylate.

267. (withdrawn) The compound of Claim 257, wherein R₁ is a protected alcohol.

268. (withdrawn) The compound of Claim 257, wherein R₁ is a protected thiol.

280. (withdrawn) The compound of Claim 269, wherein R₁ is a protected thiol.

281. (withdrawn) A compound having the formula



(24)

where:

X represents a first amine protecting group;

Y represents a second amine protecting group;

Z represents a weak leaving group;

R₁ represents an H, or a functional group, and can be attached to the molecule at positions 2, 3, 4, 5 or 7;

R₂ represents an H or a functional group;

R₅ represents N₃ or NR₂X;

R₆ represents a carboxylic acid or a strongly activated ester ; and

the stereochemical configuration at the positions 2, 3, 5 and 6, and of the carbon bearing

R₁ (if R₁ is not H) can be any of the 32 combinations of (R) and (S).

282. (withdrawn) The compound of Claim 281, wherein R₅ is N₃.

283. (withdrawn) The compound of Claim 281, wherein R₅ is NR₂X.

284. (withdrawn) The compound of Claim 281, wherein Z is OMe.

285. (withdrawn) The compound of Claim 281, wherein X is benzylcarbamate.

286. (withdrawn) The compound of Claim 281, wherein Y is 2-nitrobenzenesulfonamide.

287. (withdrawn) The compound of Claim 281, wherein Y is 9-fluoroenylmethylcarbamate.

288. (withdrawn) The compound of Claim 281, wherein X is benzylcarbamate, R₅ is NR₂X, R₂ is H, Y is 9-fluoroenylmethylcarbamate, Z is -OMe, and R₆ is a carboxylic acid.

289. (withdrawn) The compound of Claim 281, wherein R₁ is an alkene.

290. (withdrawn) The compound of Claim 281, wherein R₁ is a protected carboxylate.

291. (withdrawn) The compound of Claim 281, wherein R₁ is a protected alcohol.

292. (withdrawn) The compound of Claim 281, wherein R₁ is a protected thiol.